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**Reply to Office Action of January 27, 2000**

**REMARKS**

**The Amendments**

Claims 1, 6, 16 and 17 are amended for clarification purposes, as discussed below. The amendments do not narrow the scope of the claims and/or were not made for reasons related to patentability. The amendments should not be interpreted as an acquiescence to any objection or rejection made in this application.

To the extent that the amendments avoid the prior art or for other reasons related to patentability, competitors are warned that the amendments are not intended to and do not limit the scope of equivalents which may be asserted on subject matter outside the literal scope of any patented claims but not anticipated or rendered obvious by the prior art or otherwise unpatentable to applicants. Applicants reserve the right to file one or more continuing and/or divisional applications directed to any subject matter disclosed in the application which has been canceled by any of the above amendments.

**The Rejection Under 35 U.S.C. § 112, First Paragraph**

The rejection of claims 1-7, 16, 18 and 22-32 under 35 U.S.C. § 112, first paragraph, is respectfully traversed.

It appears that there may be a misunderstanding about the meaning of the claims which gave rise to this rejection and possibly some of the others. The invention of claim 1 and claims dependent thereon is directed to an optical device with a glass substrate and two or more waveguides. The waveguides are provided by channels in the substrate which have a distinct refractive index from the substrate. At least two of the waveguides have channels of differing widths such that they have different effective refractive indices from each other, i.e., the channels not only have a refractive index differing from the substrate but at least two have

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refractive indices which differ from each other. Claim 1 is amended to replace the word “distinct” with “different” in order to make this more clear. It is hoped that this clarification removes the rejection. According to applicants’ invention, there are at least two waveguide channels which have differing refractive indices due to different width of the channels. This feature is clearly enabled by the disclosure and, as discussed below, distinguishes these claims.

If the rejection is for some other reason, then applicants do not understand the basis for the rejection. The specification clearly describes and enables making and using an optical device with waveguide channels of differing width to provide differing refractive index; see, e.g., paragraph bridging pages 13-14 of the specification.

Accordingly, applicants urge that the rejection under 35 U.S.C. § 112, first paragraph, be withdrawn.

#### **The Rejections Under 35 U.S.C. § 112, Second Paragraph**

The several rejections under 35 U.S.C. § 112, second paragraph, are respectfully traversed. The first two points of rejection appear to be repeated from the first Office Action. Applicants had submitted traversals of those rejections in the Reply filed October 18, 2002, but the rejections were re-recited without specifically addressing applicants’ points in traversal. Thus, those points are re-emphasized below.

It is alleged that claims 1-7 do not recite the location/position of the waveguide with respect to the substrate and do not indicate the relationship of the laser species. But claim 1 expressly recites “waveguides defined by channels in the substrate.” The plain meaning of this is clear and is made even more clear when read in light of the disclosure and in light of what one of ordinary skill in the art would know, e.g., as evidenced by the prior art of record.

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It would be clear in this light that the waveguides are connected in solid-state fashion with the substrate as integral channels therein and are differentiated from the substrate by being a material which provides a distinct refractive index from the substrate; see, e.g., Paper D of the Appendices, Figure 1, page 21; and, page 2, lines 10-22, of the specification. The claims do recite the relationship of the substrate and waveguides and are proper. Further, claim 1 recites that the laser species is doped into the substrate. Again, the meaning of this is clear from the specification and from the knowledge in the art. The laser species is an element which is doped into the substrate to make it laser capable. Generally, this is conventional and well-known in the art, also as evidenced by the art of record here. Thus, no omitted elements or other impropriety of the claims is apparent.

It is also alleged that claims 8-15, 17, 19-21 and 33-36 do not recite steps for preparing an optical device, for heating or for how the waveguide is provided. This rejection is not understood because the independent claims 8 and 12 are explicitly directed to the steps for preparing an optical device and modifying the wavelength of the waveguides, respectively. Claim 8 recites the steps of providing the active and passive regions together and providing the waveguide therein. Providing waveguides in a substrate is well known in the art and discussed, for example, at pages 13-14 of the specification. These steps result in the optical device. The presence of a waveguide alone is sufficient to define an optical device since a waveguide transmits light and thus is a “device” which has an “optical” effect. The optical device term is a broad term here. Thus, for example, the specification makes clear that the optical device term encompasses mere waveguides, lasers, laser amplifiers and similar devices, for example; see, e.g., page 2, lines 10-12; page 3, lines 10-12; and, page 3, lines 15-18. As to claim 12, it makes clear that the step of heating is conducted on the substrate containing the waveguide channels. Such heating modifies the wavelength of the

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waveguides. How this works is described at page 14 of the specification but it is not necessary or desired to recite such in the claims. The claims recite the necessary positive claim step and the specification supports why this gives the desired result. Accordingly, the claims do not omit any steps and are proper.

Finally, claims 16 and 17 are alleged to be indefinite because they are alleged to be claiming a method/process and do not set forth method/process steps. These claims have been amended to make clear that they are article of manufacture claims and not method/process claims. A laser amplifier is a well known article of manufacture in this art and the claims are directed to such an article which contains the defined novel optical devices as waveguides therein.

For the above reasons, applicants respectfully submit that the instant claims are proper under 35 U.S.C. § 112, second paragraph, and the rejections should be withdrawn.

### **The Rejection Under 35 U.S.C. § 102**

The rejection of claims 12 and 13 under 35 U.S.C. § 102, as being anticipated by McFarland (U.S. Patent No. 5,541,039) is respectfully traversed.

McFarland is directed to creating waveguides in organic materials, i.e., polymers, by application of actinic radiation. In the background section of the patent, it is discussed that polymers can be photo-locked by applying heat in selected areas to increase the refractive index in those areas, thus, producing waveguide structures.

But neither the McFarland invention or the prior art discussed in its background suggests a method for modifying the wavelength of pre-existing waveguides. As applicants' specification discusses at page 14, the invention of claims 12 and 13 relates to modifying or tuning the wavelengths of a waveguide or waveguides in an existing substrate. Not creation

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of waveguides. McFarland teaches preparing a waveguide and does not teach or suggest a method for modifying the wavelength of one or more waveguides contained as channels of differing refractive index material in a laser species-containing substrate by heating. Accordingly, McFarland does not meet all elements of the claims and does not anticipate the claims. The rejection under 35 U.S.C. § 102 should, therefore, be withdrawn.

**The Rejection Under 35 U.S.C. § 103 Over McFarland in View of Myers**

The rejection of claims 14, 15, 20 and 21 under 35 U.S.C. § 103, as being obvious over McFarland in view of Myers (U.S. Patent No. 5,164,343) is respectfully traversed.

As discussed above (the above remarks being incorporated by reference here), McFarland does not disclose the basic method underlying claims 14, 15 and 20, i.e., it does not suggest the basic method of modifying the wavelength of existing waveguides by heating. The combination of Myers does not remedy this deficiency, as it also teaches nothing regarding modifying the wavelength of existing waveguides by heating. Thus, the combined teachings of the references fail to suggest the claimed invention. Thus, the rejection under 35 U.S.C. § 103 should be withdrawn.

**The Rejections Under 35 U.S.C. § 103 Over McCallion Alone or in View of Myers**

The rejections of claim 1 and of claims 2-5, 8-11 and 16-19 under 35 U.S.C. § 103, as being obvious over McCallion (U.S. Patent No. 6,270,604), alone, or in view of Myers are respectfully traversed.

McCallion is directed to methods for preparing optical waveguides from separate preformed materials by a combination of a number of physical steps, such as by lapping, polishing, dicing and bonding steps.

Contrary to the statement in the Office Action, McCallion does not disclose waveguides from channels in a substrate wherein the channels have differing widths to provide differing effective refractive indices. The Office Action refers to col. 5, line 47, to col. 6, line 13, as providing such a teaching. But this portion of the disclosure – or any other portion – fails to teach an optical device with two or more waveguides defined by channels in the substrate wherein at least two of the waveguides are defined by channels having differing widths such that they have different effective refractive indices from each other. This excerpt refers to using different thicknesses of optical adhesives as a cladding material and different layer thicknesses of its materials. But reading the disclosure as a whole, it is clear that McCallion only refers to providing such different thicknesses on differing optical devices, i.e., not having different such thicknesses for different parts of the same optical device. Further, these portions of the disclosure do not refer to the width of the channels anyway. They refer to the adhesive thickness which can provide a cladding to the channel waveguides and to the thickness of the pre-prepared layers. The materials which provide the waveguide channels are discussed in McCallion, for example, in connection with element 12 in Figures 2G and 2H. While it appears to be true that one could use the McCallion method to provide waveguides of varying dimension, there is certainly no suggestion to provide a single optical device which has multiple channel waveguides wherein at least two of the channel waveguides have differing widths. The disclosure at col. 7, lines 13-23, refers to providing waveguides with different cross-sectional configurations but in no way suggests providing such differently cross-sectioned waveguides in a single substrate or suggests any reason why one of ordinary skill in the art would want to do so.

The suggestion to use the McCallion method to provide a product such as in applicants' claims could only come from applicants' own teachings. There are no teachings,

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except applicants' teachings, providing any reason or suggestion for having waveguide channels of differing width on a substrate. But applicant's own disclosure cannot be used as a blueprint or guide as the necessary motivation under 35 U.S.C. § 103 to arrive at applicant's invention; see Grain Processing v. American Maize, 5 USPQ2d 1788, 1792 (Fed. Cir. 1988); and Orthopedic Equipment Co., Inc. v. United States, 217 USPQ 193, 199 (Fed. Cir. 1983). Thus, the cited prior art of McCallion does not support the 35 U.S.C. § 103 rejection and it should be withdrawn.

Myers has been discussed above and that discussion is incorporated herein by reference. Myers is cited only for its teachings as to embodiments of certain dependent claims. It teaches nothing regarding waveguide channels of differing width and, thus, fails to cure the above discussed deficiency of McCallion to teach or suggest the claimed invention.

For all of the above reasons, it is urged that McCallion, alone or in view of Myers, fails to render the claimed invention obvious to one of ordinary skill in the art. Thus, the two rejections under 35 U.S.C. § 103 based on McCallion should be withdrawn.

### **The Obviousness-Type Double Patenting Rejection**

The rejection of claims 2-7, 16 and 22-36 for obviousness-type double patenting over U.S. Patent No. 6,430,349 is respectfully traversed.

It is urged that the above-recited instant claims and the above-recited claims of the '349 patent are directed to patentably distinct inventions. The instant claims which depend from claim 1 all recite an optical device which has channel waveguides characterized in that there are at least two channels of differing width which provides them with differing refractive indices. The claims of the '349 patent may have channel waveguides of differing refractive index but the difference is not provided by having channels of differing width but

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rather by other means which distinguish those claims. The claims of the patent do not recite channel waveguides where two or more channels are of differing width. Thus, the patentably distinguishing feature of the instant claims is not a patentably distinguishing feature of the patented claims.

Accordingly, the obviousness-type double patenting rejection should be withdrawn.

It is submitted that the claims are in condition for allowance. However, the Examiner is kindly invited to contact the undersigned to discuss any unresolved matters.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,



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